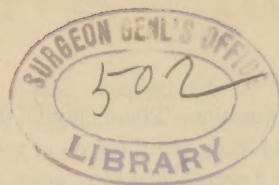


ALLEN (N.)

Laws of Inheritance



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LAWS OF INHERITANCE.

BY NATHAN ALLEN, M.D., LL.D.

IN a sanitary point of view, no subject is so important to human welfare as that of Heredity. Its laws are primary and fundamental. It constitutes the fountain-head of all social improvement. Hygiene and sanitary agencies are important, but the *quality of the material or the kind of stock* upon which these operate are still more important.

Within a few years much interest has been awakened with reference to the effects on physical organization transmitted from parents to children, and from one generation to another. As the science of physiology becomes better understood, the inquiry naturally arises, what kind of organization in development, structure and function is best, and what makes the difference? Then, in the matter of disease and health, some individuals and families are always feeble and sickly, while others scarcely ever complain or incur much sickness. They may be equally exposed, and take the same care, but there is all this difference.

One of the first steps in improvement is to inquire into the causes of existing evils. This is especially necessary in all matters pertaining to science. Wherever we find in nature certain differences we should inquire what are the laws that produce them. In all the products of nature and the changes to which they are subjected, there are fixed relations. In nature's operations there is no chance or irregularity, but settled, fixed relations, though we may not always understand them. Such has always been the history of science.

In all sanitary work there are two distinct fields of observation—one that pertains to the causes and prevention of diseases that arise external to the body, and

the other to those diseases, or predispositions to disease, which are inherited. There are also weaknesses, or liabilities to disease included in the same class. In the former are found those diseases traced directly to bad ventilation, impure water, improper food, too much or too little exercise, carelessness in clothing, exposures to infections and contagious diseases, etc. In the latter field is found a large class of inherited diseases—the germs, the predispositions, the liabilities that are transmitted. In the work of sanitary reform, too much attention has been devoted to the external field, and not enough to physical organization itself. The more this whole subject is investigated, the more importance shall we attach to those great underlying laws of *heredity*. To this feature in the work of sanitary improvement we would call special attention. The fact that there is a class known as hereditary diseases is admitted by the oldest medical writers.

In the early history of Greece and Rome we find frequent reference by different writers to the resemblance between children and parent, and occasionally mention is made that certain diseases were transmitted. But near the close of the last century, when a correct knowledge of the anatomy of the body in a diseased state was discovered by dissection, the *causes* of diseases became far better understood. The study of pathology has thrown a vast amount of light upon this subject. When this study is pursued with more particular reference to the physical qualities transmitted from parent to child, the laws of inheritance and human responsibility will be far better understood than they now are. The symptoms of some diseases, such as scrofula, syphilis and consumption, are so positively marked that their transmission cannot be

called in question. These may be transmitted in the blood or in the form of tubercular deposit. Several diseases near akin to scrofula, such as rickets, cancer and malignant tumors, are thought to have an hereditary origin. Also gout, erysipelas and rheumatism arise more or less from the same source.

But there is a still larger class of diseases where the seeds or germs are transmitted, requiring only time or occasions for development; or where the defect is in the organization itself, so that under certain circumstances, or exposed to certain influences, diseases of structure or function will inevitably be generated. In books, these are denominated constitutional or predisposing causes. The fact is well established that in case of a great predominance of any parts or organs of the body, a certain class of diseases are more likely to follow. If the brain and nerves greatly predominate over other tissues, neuralgia and affections of the head will follow. So fixed is this relation between organization and disease, that the particular class of diseases to which an individual is liable may be predicated beforehand. The reason why diseases originating from hereditary sources—and we add also the laws of inheritance—are not better understood is because we have no typical or normal standard of physical humanity. The causes and prevention of disease have been altogether too much studied outside of the body, and not enough in those *agencies* that are constitutional and inherited. If we had constantly set before us a universal law, or in other words, a normal standard of organization, it would aid us to understand far better many things about the human system.

Now, has not nature established such a standard? Is there not abundant evidence of it? We might furnish a volume in proof and illustration of the doctrine, but must be content in suggesting here only a few points. If there is one type or organization found in nature better than an-

other, may there not be one better than all others? If in a single instance, or in a number of cases, we find a law or laws of heredity established, does it not imply that there may be a general law or some standard from which they originate and by which they can all be tested and classified?

This normal standard of physiology is nothing more or less than a general law of health, of longevity, the greatest amount of happiness, of human achievement and of what lies at the foundation of all these, the *law of increase*. It is based upon the perfectness of structure and function; or, in other words, that every organ in the human body should be perfect in structure and that each should perform its legitimate functions in harmony with others. Taking this, then, as a standard, we have a guide or type by which all changes in organization may be tested.

This law applies not only to the human race, but extends throughout the whole animal and vegetable creation. But nowhere in nature do we find perfect human standards—only approximations towards them—the deviations being almost endless in variety. As “like begets like”—here comes in the law of *heredity*—and as two distinct agents are concerned in the union, the hereditary effects become more varied and complicated. If the organization of both agents or parents was perfect or very near alike, we should find the law of likeness or resemblance more generally exemplified in their offspring. But in this union of the sexes, the results depend much upon several conditions such as age, mutual adaptation, the health, the physical and mental state of the parties. There are also some other conditions which modify this law of human increase, such as food, climate, exercise, etc., though these are mostly external, and exert their influence after the birth of the offspring.

It may seem at the first thought, in the blending and mixing up of so many dissimilar qualities, that weaknesses, defects

or diseases could not easily be traced from child to parent or through successive generations. It may be difficult in some cases, but then in proportion as these deviations or peculiarities are marked or predominant in organization, they are more likely to be transmitted, and perhaps in an intensified form.

The question may be asked, if this hereditary influence extends to every internal organ, and to every tissue in the system? It undoubtedly does, even to all parts of the brain. Thus the groundwork of mental qualities, moral sentiments, propensities, social and domestic attachments is transmitted.

It will be observed that the most prominent feature in this normal standard is *harmony* or *balance* of organization. Every organ in such case is capable of doing its own work easily, in the best possible manner, and in the performance of its functions it does not interfere with or hinder others.

This is the secret of good health and long life. With such a standard the "wear and tear," or the demands which nature makes to support life, and carry on its operations, comes upon all the organs alike.

In some respects the body may be compared to a perfect machine, made up of many complicated parts. How different is the working or running of such a machine from one imperfectly constructed and unequally balanced in its parts! The one seldom needs repairs, the other, constantly. The one will last, as it were, for an age; the other is entirely worn out in a short time. But in the human body we have something more than mere *mechanism*—we have an organized living being, with the most delicate and complicated parts wonderfully exposed, and when once radically injured, or broken down, they cannot easily be repaired.

Taking this normal standard as a guide, we see that wherever there are extreme developments—where a certain organ, or class of organs, are relatively too large

or too small, causing a want of balance or harmony of action in the system, there must be, in the very nature of the case, far greater liability to disease. For wherever these abnormal developments are carried to extremes, nature's laws are more frequently violated, and hence arise some of the most fruitful sources of disease. It is in this imperfect, ill-balanced organization where we find not only the greatest amount of sickness, but that which is most obstinate in treatment and fatal in its results.

It is a well established fact in pathology that whenever any part or organ in the system becomes diseased, other parts or organs in close proximity, or through sympathy, are soon affected, thus extending the disease. Sometimes, if the part affected is important, or is a vital organ, it may be sufficient to cause death, perhaps suddenly; whereas, large parts of the body are comparatively sound, or so little affected that the individual might, as far as these parts were concerned, have lived many years, if not to a good old age.

On the other hand, the greater is this harmony or balance of organization, or the nearer one approximates to this normal physiological standard, we find not only less disease, but far greater power in nature to throw off or resist disease. The fact is well known to physicians that there is a surprising difference in patients as to what are called "the recuperative powers of nature." This difference in vitality arises, in a great measure, from the source here mentioned.

The primary object of hygiene is the prevention of disease; but how or where can it be so effectually prevented, or upon so large a scale, as by a proper observance of hereditary laws? By applying hygiene or sanitary agencies in the matter of ventilation, drainage, pure water, etc., we only cut off some of the branches of this upas tree; but by strictly observing hereditary laws, we eradicate or destroy the

roots of disease. It is much easier to dry up the springs or cleanse the fountain than to check or purify large flowing streams filled with feculent matter. While more and more attention should be given to sanitary agencies, those fruitful sources of disease *within the body*, arising from violation of physical laws, should not be overlooked.

Within a few years much interest has been manifested in the laws of heredity. The subject has been discussed in books, in journals, and by the daily press. All admit, in general terms, its importance. Some consider it as not only the most prolific source of disease and insanity, but that it constitutes a primary cause of much of the pauperism and crime of the present day. And what is significant, those who have given it the most thought and consideration attach to it the greatest importance.

If the hereditary influences already brought to light seem to possess so much value, may not these agencies, when better and more fully understood, possess a value and an importance that has never been conceived? What is needed for this purpose more than anything else, is some general law or principle as a guide—a normal standard, perfect in itself and universal in its application. Nature has, we believe, established such a standard, with agencies and conditions which can be understood and applied. It will be found that man has a far greater control over his health and life than has been generally supposed.

Near the close of the last century attempts were made to improve the quality of domestic animals. In process of time it was found by experiments that great improvements could thus be made, and, by following up these measures, the most surprising changes have been effected in almost every class of domestic animals. For a century or more have these improvements been carried on, and never more successfully than at the present time. All

the results reached go to show that these changes are governed by law, and that there must be in respect to the animal creation a general law or a normal standard of organization.

The same physical laws that govern the animal kingdom apply also to man, under different conditions. Man is a free moral agent, governed by reason, not instinct. He is accountable directly to his Creator for the use of all his powers. He is accountable, moreover, for what he *might be*, as well as for what he is. God has wisely ordained the family institution for the best interests of the race. While accountability to his Creator and duties to the family and his fellowmen are paramount, they do not annul or suspend physiological laws. With these two objects in view, the observance of these laws, on the part of man becomes more important and sacred.

This physiological standard has a wide range of application. It helps us to explain some things which have been difficult to understand. It throws much light upon genius in its varied developments, upon great versatility of talent, upon marked eccentricities of character, upon insanity in its almost endless forms, etc.; also upon the defective classes, as the blind, the deaf and dumb, the idiotic and feeble-minded. By a careful examination of all these anomalous cases, in searching for the causes and comparing them with one general standard, we may obtain valuable information.

The "intermarriage of relations," in its good and bad results, has puzzled many writers; but its peculiarities and apparent contradictions can in this way be very satisfactorily explained. Closely connected with this topic are two others, designated "cross-breeding" and "breeding in and in," the peculiarities of which can thus be explained. This normal standard will enable us to understand better the physical peculiarities and differences of people belonging to different tribes,

races and nations ; and, also, some singular differences or changes in population, in its increase and decrease ; in its birth and death-rate, and other things.

The greatest blessing an individual can have in this world is a sound, healthy well-balanced constitution, which can be obtained only from sound, healthy parents. On the other hand, the greatest misfortune that can befall one, is to inherit a body feeble, ill-balanced and predisposed to disease. No language can describe the

advantages and disadvantages which, from this one source, must attend these two persons through life. Whether we consult the interests of the individual, or of the community at large, there is no knowledge, in a worldly point of view, so important or so valuable as that of the laws of inheritance. It is not only the privilege—but the duty of the medical profession to investigate these laws and reduce them to some system.

REPRINTED FROM THE
NEW ENGLAND MEDICAL MONTHLY,
FEBRUARY, 1886.



